



Delivering market-based access to clean cooking fuel for displaced populations the Kigoma region, Tanzania: a business plan

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Background / rationale

Two phases of a pilot scheme to supply LPG in the Nyarugusu refugee camp in 2017, and follow up research conducted by UNEP DTU Partnership, reveal a strong desire and willingness to pay (WTP) among refugee households for LPG as an alternative to traditional biomass for cooking. This reflects the relatively high financial and non-financial costs of woodfuel and charcoal use in the camp, which in turn is a function of the size and profile of the camp. Where there is a willingness to pay (WTP) for any given good or service, but where the market is constrained in meeting this demand (such as in a refugee camp), there is a need for an intervention to create a market. This market creation plan is the outcome of various discussions with key stakeholders which took place between November 2017 and January 2018, the full list is presented in section 7. It intends to give a clear picture of the opportunities and challenges, along with the different options available to developing a market for LPG in the Kigoma region. The aims and intended outcomes of the LPG market creation programme support the Tanzanian government's ambition to scale up the use of LPG across the nation. In the context of the refugee camps in Kigoma, it also addresses the GoT's aim to help reduce deforestation and conflict risk with the local communities surrounding the camps. It is also aligned with UNHCR's protection remit and with the emerging global framework of actions to supply clean, sustainable and affordable energy for displaced people, as part of global efforts to deliver on SDG7. Following comments and feedback provided by the UNHCR, a shorter concept note will be developed, targeted at funding agencies and donors.



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1. INTRODUCTION

1.1 Overview of the energy situation in the refugee camps of Kigoma region

The on-going political unrest in the Great Lakes area has forced more than 300,000 refugees from The Democratic Republic of Congo (DRC) and Burundi to seek asylum in Kigoma region, Tanzania. Almost all of them are living in three camps: Nyarugusu, Nduta and Mtendeli. Over 95 % of refugees use firewood or charcoal for cooking, heating or lighting, which is being collected from the forests in and around the camp. On average each person requires 1.2 kg of firewood per day for cooking, which, based on the present refugee population equates to a daily firewood demand of approximately 380 tons. This has led to rapid forest degradation in and around the camps, and a sharp increase in the prices of this basic resource. Competition for limited natural resources exacerbates conflicts between the refugee and host communities, which in turn has become a major risk factor during firewood collection, especially for women. The current unsustainable use of biomass for cooking undermines food security, produces high levels of exposure to Household Air Pollution (HAP) and places women and children at risks of Sexual Gender Based Violence (SGBV). Combined, these issues undermine UNHCR's mandate to protect refugees.

The Moving Energy Initiative (MEI) has been the first consortium to analyse, structure and quantify the depth of energy poverty in refugee camps. Using the SE4All framework, they report that in 90% of the world's refugee camps, households found themselves in Tier 0 or 1 meaning little to no access to basic energy services. Further to that, UNEP-DTU Partnership (UDP) conducted a study¹ in Nyarugusu camp revealing the situation with regard to energy access to in Kigoma. The key findings of that study are presented below:

- 79% of the families are cooking on a mud-stove, using biomass
- Firewood is the primary household fuel (88%) followed by charcoal (35%)
- During firewood collection, 52 % of survey respondents experienced cases of violence (intimidations, fights, rapes)
- 20% of households are bartering food rations or soap in exchange of fuel
- Although it is officially forbidden, refugees are venturing outside the camp to collect firewood, spending an average of twenty hours per week on this task. In 85% of the families, women and children are in charge of this activity
- Of the families who buy their fuel (53% of the camp), the average expenditure is \$12 USD (TZS 26,394) per month, i.e. more than 50% of the capped salary in the camps

The impacts of current energy use in Nyarugusu camp are not only social, but also economic and environmental. Based on a conservative consumption of 4 kg of firewood and 2.3 kg of

¹ Rivoal, M. Haselip, J. (2017)

charcoal per family, per day; the incomplete combustion of this fuel in open fires emits 125,000 t of CO₂ equivalent per year in Nyarugusu camp. Additionally, 2,200 hectares of forests are depleted in the surrounding of the camps each year. The UDP study also recorded an increase in the prices of firewood and charcoal, by a factor of three, since the Burundian influx (2015), which further increases the share of household budgets spent to secure fuel for cooking and heating.

1.2 Aim of the programme

The overall objectives of the intervention described in this report (the creation of a market for LPG in the UNHCR administered camps in Kigoma) are to 1) ease the pressure on the natural resources of the region, 2) to pacify the relationships between the refugees and the host communities, and 3) to increase refugees' welfare/well-being through the introduction of LPG.

The target beneficiaries are:

- 20,000² families in the three refugee camps of Nyarugusu, Nduta, Mtendeli
- 5,000³ families from the host-communities

The aim is not a 100% coverage of the refugees or host community during the first year of the intervention. Rather it should be seen as a progressive inclusion of all beneficiaries, as the price of LPG decreases and as the economic opportunities increase. The Dutch NGO SNV will execute the programme in collaboration with the UNHCR, local NGOs, and ORYX (the private gas distributor who supplied LPG under the two phases of the pilot scheme in Nyarugusu).

1.3 Rationale

Why LPG?

In 2017, UDP carried out a study that aimed to monetise all the costs and benefits associated with the use of LPG, as compared to a business-as-usual/ baseline scenario in which the households continue using biomass in open fires. The results are unequivocal: the UNHCR should embark on a new household energy strategy and widely promote the use of LPG at a household level. In fact, over a ten year period at current prices, the roll out of LPG would cost \$397 per capita and yields a benefit of \$700 with a benefit-cost ratio of 1.76. The economic rationale behind the intervention is clear: cooking with biomass generates hidden costs that need to be calculated and monetised to account for the true cost of current practices. Cooking

² & ³ To be confirmed

with LPG delivers numerous co-benefits, such as: health improvements due to lower exposure to indoor air pollutants; mitigating the emissions of carbon dioxide and black carbon by a ratio of 10 to 1, compared to firewood. LPG is also an effective means to mitigate the risk of conflict caused by competition for biomass resources with locals, by eliminating the need to collect firewood. Other positive impacts of LPG include curtailing deforestation rates, better school attendance, improved food security and well-being. In the past, LPG has already been identified as the cheapest and cleanest source of non-woodfuel energy for Nyarugusu camp by the UNHCR (2016).

To limit the risks faced by women and to reduce conflicts, Safe from the Start has funded two pilots, each of which lasted three months, providing refugees with LPG as an alternative source of cooking fuel, in Nyarugusu camp in 2016 and 2017. UDP surveyed more than 500 families after the first phase of the pilot and 95% of them have declared a willingness-to-pay for LPG (on average of \$2 monthly), indicating a strong commitment from the refugee community to switch to cleaner energy along with a potentially high adoption rate. The last study from the Moving Energy Initiative (MEI) supplements these conclusions by reporting that in Goudoubo camp (Burkina Faso), two-thirds of the resident stated a WTP for cooking solutions, indicating a market worth up to \$270,000 per year.

The intervention proposed in this report also takes into account the experience of the UNHCR in other countries. To date, the most relevant LPG project is one implemented by UNHCR in Diffa, Niger, summarised below.

Case study: DIFFA LPG PROJECT

Due to Boko-Haram operations in North-East Niger, Diffa region has witnessed a significant displaced population since May 2013. In 2017, it was hosting 225,000 refugees and internally displaced people forming more than 25% of the total population. This has placed pressure on local natural resources including firewood, for which households spend 30% of their average incomes of \$57 per month. In Diffa, firewood is 4-5 times more expensive than LPG. It is estimated that for every 1,000 kg of LPG consumed, 4 hectares of savannah are spared of woodfuel collection.

Since 2016, UNHCR has implemented the SEED programme (Soutien Energétique et Environnemental dans la région de Diffa). SEED was financed by the EU and has been characterized as ‘an instrument contributing to security and peace in the region.’ Over the course of six months, UNHCR supplied 27,000 families with LPG (cylinders + burners +stoves) and the equivalent of 9 x 6kgs for refilling’s in coupons. A partnership between the government, the UNHCR and SONIHY (the national gas provider) ensured a rapid LPG uptake, the development of quality standards and a good public perception.

The success of SEED appeared to follow a number of principles:

- Early discussions took place between SONIHY and the UNHCR. SONIHY self-financed the installation of five LPG refilling stations of 10 MT and one of 80 MT. Following this new market creation, the price of a 6 kg cylinder decreased from \$9 to \$4.
- The programme received the complete support of the government (the Ministries of Environment, Energy, Gender and Childhood) and an adequate feedback mechanism was implemented to ensure transparency and local support.
- It created jobs through multiple mechanisms:
 - The education and awareness creation aspect of the project was conducted by 140 young locals recruited among the communities.
 - 27 reselling points were installed all over the region, creating jobs, knowledge and building capacity
 - 300 firewood resellers were identified and received financial compensation (305€) for the loss of income derived from the massive switch to LPG in the area, accounting for 5% of the total programme budget.
 - The LPG stoves were built locally, thus ensuring a greater local share of the value chain, forming new craftsmen.

Diffa is now the region in Niger with the best infrastructure for LPG, and the second largest consumer, after the capital Niamey. Furthermore, the SEED programme increased the beneficiaries’ welfare through the reduction of their fuel expenditure, and contributed to peace and stability through conservation of the local environment.

Why a market-based approach?

The refugee camps in Kigoma region were established in 1996. Therefore, there is a need for humanitarian responses to implement sustainable solutions that appropriately address the reality of these protracted situations, and the impact they have on host communities. Market-based approaches are increasingly being put forward as the most appropriate response, creating economic opportunities for a range of actors: refugees, enterprises, host country and local communities. By facilitating the development and commercialisation of reliable, affordable and clean energy products tailored to refugees, there are significant positive spill-over effects for non-refugee rural communities. This is in line with the SDG 7 commitment to 'leave no one behind', which is the central motivation behind the emerging framework of action on sustainable energy for displaced people.

In addition, there is a growing agreement among practitioners that refugees - de facto - contribute to the economies of their host countries. As such, it is crucial to convince the private sector to develop products or services targeting this untapped market, creating jobs and value for local businesses. It also helps reduce the burden of service provision on the UNHCR and its partners organisations. In turn, this will help create sustainable relationships between energy consumers and suppliers, while attracting new technologies, as scale, to rural areas and enabling investment which may have been deemed too risky otherwise.

For the private sector, i.e. the LPG supplier, the specific context in which the intervention will operate offers some crucial advantages that reduce the commercial risk and creates non-financial value:

- Relatively low transaction and information costs due of a very high density of population in the refugee camps
- High expected demand for LPG and large expectations of change from the refugees community after the successful LPG pilots
- High scrutiny from a range of national and international actors, prompting stringent monitoring and evaluation.
- Reputational benefits from the supply of fuel to displaced people, setting an industry good practice for public-private partnership in support of SDG7, that can be replicated in other countries

2. Programme description and strategy

2.1 Objectives and outcomes

In order to address the general objectives described above, the programme has identified four components:

- An enabling policy and institutional framework (Outcome 1)
- The development of a public-private partnership model for the creation and scale-up of the LPG market (Outcome 2)
- The adoption of clean cooking (LPG) in the targeted communities (Outcome 3)
- The creation of new income-generating activities / jobs in the camps to help boost livelihoods and economic self-reliance (Outcome 4)
- A transversal outcome is to achieve greater gender equality and women empowerment (SDG5)

The intended outcomes, expected outputs and indicative activities of the programme are outlined below. Details of potential activities are also presented in the theory of change (section 3). The outputs will not be defined solely in terms of the number of stoves bought as it won't be sufficient to address the questions of efficiency / effectiveness of the programme. Therefore, a list of criteria for the evaluation is presented in Table 3 (page 24)

Outcome 1: An enabling policy and institutional framework for the promotion of cleaner energy technologies

Refugee policy in Tanzania is in flux; this uncertainty challenges the development of long-term commitments for implementing partners and risks discouraging potential donors. This is why an energy access programme such as this must include activities to secure institutional support and stakeholder confidence. It is worth stressing that, if the refugees were to leave the country, the market for LPG will still be viable serving the rural communities. Furthermore, the focusing efforts on LPG market creation in refugee camps will benefit the host communities, as increased demand in the Kigoma region (one of the most remote in Tanzania) will create economies of scale, lower prices, create jobs and strengthen local supply chains.

Output 1: Agree on a shared vision and agenda

Since the implementation of a sustainable subsidy scheme is dependent on political good will, government support and buy-in is essential. Although the policy decision will be taken at the ministry level, an extensive consultation is required with the regional and district departments. This will generate accountability, ownership and ease the decision-making process, by allowing flexibility and responsiveness, during the implementation. A communication channel has to be designed to tie together the three tiers of governance namely the Ministry of Home Affairs,

the UNHCR and the NGOs (e.g. the implementing partner). The programme will develop an effective mechanism for coordination, communication and programme delivery to enable collective effort, working towards a common vision. A series of stakeholder consultations will be conducted, with roundtable discussions enabling actors to communicate concerns and align their views. The aim of which is to generate a high degree of buy-in from the government, the implementing partners, the refugees and the host community.

Output 2: Technical capacity building of government staff for identifying the best route-to-market for cleaner energy solutions

Formal training on cleaner energy solutions of local government staff will be conducted to build institutional capacity. The results of the programme will be systematically documented for broader sharing as the lessons learnt may be applicable in other regions of Tanzania, for other populations. The experience of using micro-credit and smart subsidies to help the poor to access LPG are of relevance for the country. Indeed, in 2017 the government committed to ban charcoal use by 2025, placing greater emphasis on LPG use as an alternative fuel.

Output 3: Database of results for advocacy and dissemination activities

The programme seeks to raise awareness of the magnitude of energy poverty in protracted refugee situations, and Kigoma in particular. It further advocates for the use of public-private-partnerships and market-based solutions tailored to the needs of the local and refugees' communities, which in turn, intends to demonstrate the regional economic benefits of investing in cleaner energy at household level. This ambition entails the creation of robust monitoring and evaluation process; strengthen of sharing mechanisms and the production of knowledge products (policy briefs, newspapers articles etc.)

Next steps:

- Choose a project manager within every organisation (UNHCR, SNV, MHA)
- Start the consultations with the government in Dar es Salaam and in Kigoma
- Prepare a list of key arguments to convince the GoT

Outcome 2: The development of a public-private partnership for the scale-up of the LPG market

In order to create a market, this programme requires action on both the demand and supply sides, increasing the demand while ensuring the delivery of high-quality services to build trust and customer satisfaction on the long term. The programme is seeking to combine different public and private instruments to design and develop consistent financial incentives which can accelerate the commercial development and end-users' adoption of LPG.

Output 1: a Memorandum of Understanding between ORYX, the gas supplier and the UNHCR is signed

Crucial to the success of this programme is the partnership with ORYX. UDP held bi-monthly discussions with ORYX from November 2017 to February 2018 and the UNHCR organized visits to the camps and market assessments. The main potential barriers or risks identified in this process are the following:

- The risk of undermining the current LPG market in Kigoma, by favouring the refugees who can buy LPG at a cheaper price than in the rest of the region
- The risk of the cylinders being stolen due to subsidies that significantly distort the market for cylinder re-filling
- A low-demand for LPG, compromising their operations

To overcome these potential barriers, it was agreed that

- The price of refilling the cylinders in the camp should be as close possible to the market prices in the Kigoma region (=TZS 22,000), so as to minimise the risk of 'leakage' from the camp to the local economy
- The host community should be included in the subsidy programme, to lower the up-front cost of deposits paid for cylinders
- A stringent enforcement mechanism has to be in place to ensure that the refugees don't resell their cylinders – See section 4 on risks
- ORYX is experienced in investing in rural areas, understands the commercial risks, and so no financial compensation whatsoever should be envisioned in the case of a lower than expected demand for LPG within the camps
- UNHCR will assist to obtain long-term entry permits to ORYX and MEGS to facilitate their operations in the camps

ORYX is a direct beneficiary of the programme, as new demand increases their market share, penetration and turnover. As such, Oryx is willing to contribute to the programme to ensure a sustained demand, achieve the desired outcomes. The economic and financial competitiveness of the LPG refilling prices is the most critical factor in ensuring a sustainable market, and a high uptake rate.

UDP's research (2017) revealed that 53% of the families in Nyarugusu camp are already paying for their fuel, spending a monthly average of TZS 26,000. A family of five persons would need approximately 9 kg of LPG for cooking, which represents a monthly cost of TZS 31,500. Therefore, it is possible to infer that the market for LPG is roughly 15% of the households in Nyarugusu. This number is the lower baseline conservative and does not include the new customers gained through the subsidy scheme. The price of firewood¹ is currently at xx and charcoal at xx. A market assessment has to be conducted to estimate potential of the LPG market in the two others camps.

Output 2: several grants are obtained to support the programme

Where there is a willingness to pay (WTP) for any given good or service, but the market is constrained in meeting this demand (such as in a refugee camp), there is a need for an intervention to create a market. This programme will seek the financial and technical support from donors: OFID, the EU; and from private (the World LPG Association) and public (the Global Alliance for Clean Cookstoves) coalitions. Given the anticipated positive impact on the humanitarian sector as a whole, this LPG market creation programme aims to create a public-private collaboration model that can be applied in other refugee camps and countries, where a protracted situation has led to similar energy supply and demand scenarios. This is why it is imperative that financial resources converge towards a defined goal. The long-term characteristic of this programme might require the support of multiple donors, over time: as the funding of the first market comes to an end, another donor could step-in to increase the coverage/ the number of beneficiaries in the three camps. The description of the potential donors and their activities are presented in section 7.

Next steps:

- Once the programme is agreed, start contacting key informants (Benoit Moreno in UNHCR Niger and Michael Kelly at the WLPGA)
- Prepare a letter of endorsement/MoU with Oryx

Outcome 3: The adoption of clean cooking (LPG) in the targeted communities

Output 1: An awareness campaign is launched in and around the camp

To raise awareness among the refugees and the host community regarding the benefits of LPG, a large education campaign will be designed and launched. The three main objectives of the campaign are:

- That the beneficiaries know how to use LPG correctly and consider it a safe fuel to use

- They know where the reselling points are located, and are aware of the subsidy programme
- They understand the benefits of LPG for cooking in terms of the reduction in respiratory diseases (especially among the primary cooks and the children)

Key point to discuss and agree:

- Which agency is in charge of the education programme (UNHCR, SNV, CEMDO)
- Which communication channels are the most effective (radio, prints, theatre etc)

Output 2: the stoves are correctly used and well-maintained

After stimulating the market demand for cooking with LPG, there is a need to sustain the demand by ensuring a high level of performance of the stoves and of the supply model. We assume that high private economic benefits offered by switching to LPG fuel will sustain household demand, in the camps. However, this market creation programme transforms refugees from passive recipients in receipt of free goods and services, to consumers with wants and needs, offering them the opportunity to choose. Consequently, as per basic marketing theory, efforts must be made to retain their custom. To this end, the programme should seek to develop feedback mechanisms, and engage the resellers and the incentive workers in understanding the importance of the after-sales services. Public acceptance must also be monitored closely by the implementing partner and the UNHCR in order to ensure a steady increase in the number of households using LPG.

Output 3: financial incentives are introduced to increase adoption rates

What options are available for families to pay for LPG? Which strategy will increase refugee welfare and create a sustainable market? Below are listed some of the key options.

a- Revolving loan funds

Although the average household monthly expenditure on traditional fuels (wood and/or charcoal) is 26,000 Tsh for those that pay for it, these payments are mostly made throughout the month, as and when fuel is needed. It is therefore reasonable to assume that for many families, the main challenge will be to pay the full cost of refilling an LPG cylinder, for 21,000 Tsh (cylinders are not re-filled on the spot, rather empty ones are swapped for full ones) This payment constraint is exacerbated by the legal and economic status of refugees in Tanzania (they don't possess legally recognized ID cards), their lack of credit history naturally limits their

access to banks, credit or micro-finance institutions. Therefore, creating a revolving loan fund⁴ could be an effective measure to overcome this barrier, by providing the recipients with the required funds to pay for LPG, thereby allowing them to save money on fuel during the rest of the month.

As a first step, a proper technical assessment should be implemented to evaluate which organization would be the best placed to develop this programme. Elements which need to be considered entails the following:

- Definition of the appropriate eligibility criteria to be a member
- Who is mandated to manage the fund?
- Knowledge capacity, training and technical assistance should be provided along with
- Training material, guidelines and monitoring systems created
- Key performances indicators to measure outreach, client poverty, loan collection performance
- The rules and polices of the MHA may be an impediment to a financing scheme, in the camps

It is recommended to create one fund per zone of the camp e.g. twelve funds in Nyarugusu. Each fund will be endowed with TZS 500,000 as a starter grant. This amount allows for 50 members to borrow TZS 10,000, equating to two weeks of business-as-usual for the resellers. Every participant will have to place TZS 2,000 to access the financial facilities, and create a sense of duty. Further to that, they would be able to borrow up to TZS 10,000 per month from the fund. It is recommended to develop different strategies for borrowing terms, aiming to incentivise a fast repayment. One option could be:

- For a 30 days repayment of TZS 10,000 – the interest charge is TZS 500
- For a 60 days repayment TZS 10,000 – the interest rate is TZS 750

Experiences of such micro-credit schemes in Sri-Lanka⁵ showed loan recovery rates of 95%. Indeed, it is believed that the risks of non-payment from the lenders are minimised due to peer-pressure or the sense of ownership/ belonging brought by the collective nature of the fund (in opposition to classic financial bodies, where there is less incentive to repay smaller loans for which administrators may not wish to spend resources to recover).

b- The delicate question of subsidies: Proposed methodology

⁴ When an organisation, often community-based, loans money to individuals for a specific project. When the recipients pay back their loans, the fund is replenished, creating the opportunity to issue other loans to new members.

⁵ ADB, (2015)

When a consumer buys an LPG cylinder for the first time in Tanzania, she is required to pay a deposit of TZS 25,000. This amount might be too high for the refugees and is widely considered to be the main barrier to entry. The current market price of a 6 kg cylinder refill is between TZS 20,000 and 22,000. Experience from the LPG pilot scheme is that a family of five persons needs approximately 9 kg of LPG per month.

Both the capital and fuel costs of LPG would suggest the need for two subsidies: for the up-front cost and for the recurrent cost of fuel. However, designing efficient and effective subsidies including a solid exit strategy is not easy, and creates the risk of market distortion and leakage (sale of gas away from the target beneficiaries). This section outlines the approaches, challenges and methods that can be developed to design smart subsidies.

The most relevant argument for subsidies in the case of Kigoma is that they are desirable to help households achieve a decent standard of living and to fulfil UNHCR's protection remit. In this context, we define subsidies as 'enablers': for education, better health, to empower women, to protect the environment and to minimise conflict risk with the local community. From a purely cost-efficient perspective, subsidising access to clean cooking reduces other expenses by decreasing UNHCR's costs of treating respiratory diseases, freeing up time for income-generating activities (IGA) and reducing the afforestation costs. The CBA study demonstrated that the overall benefits of supplying LPG to the camp's population outweigh the costs by a factor of 1.76.

Targeting of beneficiaries - Selection methods

In order to be eligible for the subsidy, the households would have to opt-in for the programme by certifying that LPG is their main source of fuel, and that they won't resell the cylinder. A study in India⁶ has shown that having to opt-in, in opposition to automatic enrolment, has a tremendous impact on the outcome, bringing a sense of ownership. When a household refills their LPG cylinder, their ID card will be recorded. On the following month, they will receive a subsidy equivalent to their vulnerability status as categorised by UNHCR in collaboration with Oxfam and WFP (the process and criteria must be transparent and replicable). Each family taking part in the programme will benefit from 9 energy vouchers – corresponding to 9 x 6 kg cylinders over the six months. The amount of the subsidy for the fuel is discretionary and shall be warranted on the following grounds:

- Number of members in the households
- Number of family members working
- Number of children under five years old or Persons with Special Needs (PSN)

⁶ Tripathi, A. (2015)

Providing a direct subsidy to the consumer after her initial purchase does not lead to market distortions, as the households are buying their fuel at the current market prices. It is recommended that the amount of the subsidies does not cover more than 50% of the up-front cost (=the deposit for the cylinder) e.g. should not exceed TZS 23,000 (of TZS 46,000); or the price of a cylinder e.g. should not exceed TZS 10,500 (of TZS 21,000)

Types – Energy vouchers or cash-transfers?

The economists are often in favour of the cash transfers in the name of consumer sovereignty, meaning that the recipients are the best placed to maximise their utility given their budget constraint. Put simply, they know best as to what is good for them. However, in the case of market creation, there is a need to incentivize the recipients and direct their consumption towards the intended outcome of the intervention: in this case the consumption of cleaner fuel.⁷

So why do we recommend energy vouchers in this specific case?

- In the past, the Government of Tanzania has stopped cash-transfers from the World Food Program, arguing that they were providing an incentive for refugees to come to Tanzania
- Awareness of the social benefits of using LPG is low among the beneficiaries. Consequently, only few of the recipients would opt for the consumption of LPG if they were to receive cash.
- The aim of the programme is to encourage households to move away from biomass
- By increasing the demand for LPG, the energy vouchers are driving the market which stands to benefit the entire region
- In the case of clean cooking, the social benefits associated with the reduction of biomass may be larger than the private benefits, thus there is strong need to enforce the new policy.

Scaling up the energy voucher intervention could give rise to the creation of ‘energy trade fairs’ following the examples of the ‘Agricultural Input Trade Fairs’⁸ implemented by the Food and Agriculture Organization in Cambodia for example. They give farmers the opportunity to buy quality agricultural products through the exchange of their vouchers. These households’

⁷ A randomised control trial conducted in a humanitarian setting in the Democratic Republic of Congo (DRC)⁵ showed no evidence of increased well-being between recipients of vouchers and cash-transfers for food items. An explanation is that the beneficiaries were equally able to resell their vouchers or the food purchased. What is interesting about this study is that the differences between the modality of distribution has influenced the category of items purchased, but it did not alter the food consumption or another proxy for well-being between both groups.

⁸ FAO, 2016

energy fairs could be envisioned as market-based responses to consumer needs offering them a range of quality products and services. Furthermore, it may appeal to the GoT to accept this programme, indeed they would bring cleaner energy technologies to the region hereby diving the consumption of such products, in line with the SDG7. This is also in line with the activities of Energising Development⁹ and SNV in the Great Lakes region.

To conclude, in this case, supplying recipients with energy vouchers is envisioned as a cost-effective means of welfare improvement. They should be time-bound, transparent and measurable. Nevertheless, the correct calibration of the subsidies is what separates success from failure, consequently it is suggested to test the subsidy mechanism during a consultation with the refugees' advisory committees, and with the refugees themselves in focus groups.

c- KopaGas

An innovative social enterprise such as KopaGas, which is developing pay-as-you-go (PAYG) technology for LPG, will be included in order to respond to the low ability to pay of the target population. A detailed description of KopaGa is given in section 3. As of 2017, nearly 30 companies operating in at least 32 countries provide access to consumer capital for off-grid solar using digital finance, and we foresee the same expansion in the clean cooking sector. However, a few challenges hamper the development of KopaGas technologies, and we envision their integration in the programme after 6 to 12 months. For example, the technology is only applied to 15kg LPG cylinders, which coincides to the consumption of SME but not households. Their smart-meter is an expensive technology, thereby the risks of thefts must be kept very low. KopaGas currently operates within a small area in Dar es Salaam and their implementation in Kigoma would involve additional costs which don't make sense given the current regional LPG demand, unless they receive financial support from donors. However, we believe that this PAYG technology has great potential and application in serving the needs of the refugees in Kigoma, so the discussions are on-going.

⁹ See a list of their activities [here](#)

Key points on financial incentives

There are several financial strategies to help refugees access LPG: revolving loans funds, energy vouchers, PAYG technology. These options are complementary and correspond to the varying ability to pay among the recipients. The exact value of the subsidies has to be decided, with UNHCR and potential donors. This will depend of the number of beneficiaries targeted, and the opportunities for the development of IGA, which relates to Tanzania's broader refugee policy. Finally, donors are striving to develop effective subsidy schemes for clean energy access and the huge replication potential of this intervention should not be underestimated.

Outcome 4: New income-generating opportunities/jobs are created in the camp to trigger development and self-reliance

This intervention is firmly grounded in the belief that prioritising development multipliers (energy provisions) over short-term solutions will bring large concomitant economic benefits. At the moment, refugee households have limited disposable incomes because they have restricted work opportunities. The current capped salary in the camp is TZS 60,000 per month (\$27). This programme aims to increase the recipients' self-reliance through three schemes, presented below.

Through this research, the LPG distribution was decomposed (in collaboration with ORYX) with the aim of initiating a vibrant, profitable and efficient value chain of benefit to the local economy (within and around the camp). There are two stages where the refugees and the host community alike can play a role: 1) at the production point – for the trivets (stove tops) and 2) at the delivery point.

Output 1: a small-scale manufacturing activity is operating in/ or around the camps

The trivets for LPG stoves are currently being imported from Kenya. They can be described as a low technology. Made of metal, they are often assembled from recycling materials. In Kigoma, the trivets are currently sold at a price varying between TZS 8,000 and TZS 10,000 (wholesale) and between TZS 10,000 and TZS 15,000 (retail). ORYX believes that there is an opportunity for establishing a small-scale factory in the camp and has provided UNHCR with the design of the trivets, in Appendix. Contingent upon them being of high quality and competitive prices, ORYX suggested that they could purchase the trivets directly from the factory and sell them through their networks, thus ensuring a constant level of demand. The creation of the factory would be financed with a grant and will be run by an implementing partner.

Output 2: a network of LPG refugees resellers is established within the camps

Provided that the Ministry of Home Affairs approves the sale of LPG in the camp, there is scope to develop a distribution structure inside the camps. In addition to generating livelihood opportunities, this action, by expanding the LPG coverage in the area, will drive consumption.¹⁰ Oxfam (or another NGO) will select and train groups of women refugees to work as LPG resellers within the camps. They will be taught on the following aspects:

- LPG usage and benefits
- LPG refilling and the swapping of bottles
- Accountability and sales reporting
- Customer monitoring
- The training provided is also sought to be embedded into the curriculum of vocational schools or as environmental/ technical training.

Following ORYX's guidance and to ensure safety, the resellers must possess:

- A fire certificate issued by a local fire department upon inspection of the facility.
- A fire extinguisher(s) ¹¹
- The point of sales (POS) to be cleared of any fire hazard. No activity in the area where there could be a source of ignition, like welding work etc.
- An approved weighing scale inspected and passed by Tanzania Weights and Measure Agency (WMA).
- A valid business license and other relevant local authority permits if the business is formal.
- Finally, it is advised to store the cylinders outside, in a lockable cage
- ORYX Representatives will be visiting the POSs within the camps regularly, as they do with other markets, to monitor the resale procedure and ensure compliance with health and safety, training, stock levels, pricing, etc.

¹⁰ During the two phases of the pilot, only two distributions point were put in place. This lack of coverage forced residents living in the outskirts of the camp, to walk up to six kilometres to reach a shop, thus discouraging or slowing consumption/ adoption rates.

¹¹ the local fire department should advise on the quantity and other requirements etc.

ORYX calculates that one selling point has the capacity to manage between 50 and 100 clients. A typical dealer sells between five and ten cylinders a day in Kigoma (between ten and twenty cylinders a day in Dar es Salaam). The resellers will obtain the cylinders at a price of TZS 18,500. ORYX, through his licenced distributor MEGS, will guarantee the pricing and the distribution. They will subsequently sell them to the consumers at a capped price of TZS 20,000 or 21,000 allowing them to earn TZS 1,500 per cylinder, thus developing a bankable business model. Based on this calculation, we estimate that a reseller will earn at least TZS 150,000 ($\text{TZS } 1,500 \times 20 \text{ days of operation} \times 5 \text{ bottles per day}$) per month. Each reseller point should be operated by two to three women. In this case, the monthly salary of each of them would not exceed the capped salary of the camp of TZS 60,000 (as decided by the MHA). This should facilitate the acceptance of the network distribution by the MHA as it stays in line with their employment policy.

The resellers don't have access to micro-finance institutions which would limit their ability to borrow money in order to buy their first stock of cylinders. However, the UNHCR currently possess a stock of 3,000 cylinders they bought during the first two pilots. It is therefore suggested to supply the resellers with 25 cylinders each (the equivalent of one week of business-as-usual operation). This free stock will be considered as a form of 'start-up grant' and their deposit shall not be reclaimed by the UNHCR. Following the sales of the first 25 cylinders, the resellers will be well positioned to place an order to MEGS and a commercial relationship will be created between them. MEGS accept both cash and mobile-pay, which is already well-established in the camp.

The key actions envisioned to deliver this output are: the presentation and validation of the distribution structure proposal to and by the MHA, followed by the signature of a contract between the resellers and the super dealer (MEGS).

Output 3: new micro-enterprises are created

Acknowledging that households (mostly women) spend on average twenty hours per week to collect firewood and approximately six hours per day cooking; it is essential to recognise that this significant loss of time constrains the development of others activities, whether they are related to business, well-being or education. During a study¹² conducted in Nyarugusu after the first pilot, 26% of respondents declared that, with the time they saved they were able to conduct income-generating activities (IGA) such as selling food items, or performing different types of trades (carpentry, hairdressing, tailoring). Therefore, assuming that the recipients will

¹² Rivoal, M. Haselip, J. (2017)

save considerable time when switching to LPG¹³, the idea here is to harness their potentials by providing them with the right entrepreneurial tools, thus supporting their small-business ideas.

Key points:

It is crucial to ensure the development of IGA to reach a sustained demand for LPG. Three approaches have been detailed: participation in the LPG value chain through creation of a small factory to manufacture trivets, LPG resellers and indirect support to small entrepreneurs.

Cross-cutting outcome: Achieve women empowerment

Time spent cooking and collecting traditional fuels deprives women of access to education during their youth and to access to Income Generating Activities (IGA) later in their life. This unpaid labour has been valued at \$37 billion a year.¹⁴ In general, in Kigoma women have shouldered the responsibility of all cooking-related activities, which includes meal preparation, but also in gathering, purchasing and preparing fuel. In Nyarugusu camp, the key facts are:

- In 85 % of the families, women are solely in charge of fuel collection and cooking
- Half of respondents declared having faced violence or Sexual Gender Based Violence during this activity¹⁵
- Women are the most exposed to harmful exposures from PM_{2.5} released during the cooking process, which takes on average six hours a day

We advocate for the integration of women at every step of the programme: manufacturing the trivets, working as LPG resellers or in the revolving loan funds, and during the education campaign.

More evidence is needed to determine the extent to which cooking with LPG will affect gender-equality and empower women. Below are listed some of the issues which need to be explored:

- Division of labour: Who traditionally builds the stoves, repairs them? Who chops the firewood? Who buys firewood and/or charcoal?
- Is there a reluctance among men to switch to LPG?

¹³ During the CBA's study, the primary reported benefit of using LPG revolved around 'time savings', quoted by 66% of the respondents; followed by 'no need to collect firewood' by 55% and 'clean' by 42%.

¹⁴ Masera et al., 2015

¹⁵ However, it is crucial to remain cautious about causality, as clean cookstoves interventions don't necessarily translate into reductions of violence. In his meta-study, VU (2014) estimates that one in five women has experienced sexual violence in a humanitarian setting, which includes early marriage or domestic violence. Therefore, we should be reminded against exaggerated claims consisting of a nexus ICS-reduces-rape (Abdelnour, 2014).

- Financial decisions: does access to credit require the husband to control or consent? What is the threshold below which women can make their own decisions? Are women limited due to their lack of authority over households' financial allocations?¹⁶
- Does cutting the time spent cooking and removing wood collection have adverse effects? Are there adequate feedback mechanisms in place to ensure that these negative effects will be shared, if they arise?
- The focus groups consulted in the follow up to the pilot LPG scheme (2017) indicated that the use of LPG leads to a faster preparation of meals, positively affecting relationships within the households.
- A study undertaken by the Women's Refugee Commission in Nyarugusu brings some of the answers to the above-mentioned questions, hence it is recommended to start by liaising with them.

There seem to be a discrepancy between what the development community wants from the distribution of cleaner stoves (environmental mitigation, reduction of household air pollution, conflict risk) and what women need: a concrete and immediate, fast benefit. Indeed, during a survey conducted in Nyarugusu the benefit 'no smoke' was only quoted by 22% of the respondents. On the other hand, women reported that a slow cooking process may leave them prone to verbal or physical abuse from their husband, and as such shorter cooking time through LPG can be felt as an immediate and tangible benefit to women.¹⁷

2.2 Barriers and risks that need to be addressed or managed

Currently, a number of barriers and risks (potential or real) that could hamper the creation of a sustainable market for cleaner energy technologies in refugee camps in Tanzania. These are summarised in the table below and concern all levels: end-users, UNHCR, the private sector and donors.

Table 1: Main barriers to the implementation of the programme

Stakeholder	Description of barrier	Mitigations actions
Tanzanian Government	Refusal to approve investment in infrastructures e.g. the resellers and the small-scale factory in a nominally 'temporary' setting	Highlight / communicate the co-benefits and common objectives, including clear links to SDG / NDC targets. Include the Host Community in the programme
	Withdrawal from the CRRF	Demonstrate the environmental / economic benefits of the projects for the surrounding host communities and region

¹⁶During the CBA study, it was found that gender doesn't appear to be a significant variable of the WTP. However, interestingly a t-test revealed a statistical difference in the mean WTP between men: TZS 5,914 and women: TZS 4,285. Explanations as to why men stated a higher WTP, when they're not the main beneficiaries of fuel switching, would require further research.


¹⁷ WRC, 2015

	A moratorium / reduction in cash-based interventions or subsidies	Further application of CBA methods to demonstrate the economic benefits to the region.
Donors	Reluctance to finance LPG because it's fossil-fuel	Provide emissions projections from biomass against LPG. Environmental stewardship is new in humanitarian settings, so advocate for such interventions in the name of cost efficiency and in line with national priorities
	Donor fatigue: great Lakes region crisis is not new.	Huge replicability potential of the programme in other countries with protracted refugee settlements
UNHCR	Short-term funding cycle	The implementation partner (e.g. SNV) would receive and manage the funding coming from donors
	Lack of staff or internal knowledge / expertise in energy/environment	Hire an energy/environment officer Consult the expertise of staff in UNHCR Niger who implemented the same model
Refugees	Reluctance to use LPG	Education on the benefits of LPG. Include all members of the family. Numerous trainings
	Reluctance to financially contribute to LPG Limited ability to pay and no access to Micro Finance Institutions Women may lack financial independence to invest in cleaner fuels	Raise awareness on the private economic benefits i.e. LPG vs. status quo energy use. Create revolving loan funds and/or subsidise up-front cost and fuel costs with energy vouchers More data is needed. Include men in the awareness phase
	The collection and sale of firewood continues, as a form of income generation.	The project aims to reduce the rate of forest degradation, but stove-stacking (multiple fuel use) will likely continue along with the use of biomass. So there's also a need to intensify reforestation programmes.
Host Communities	Resentments / grievances emerge from a discrepancy in treatment between refugees and locals, i.e. perceived unfair benefits delivered to refugees.	Provide training, education to the host communities on LPG use; explain that refugees are buying fuel, not getting it for free. Include host communities in the subsidy programme.
	Removal of a highly profitable activity (making and selling charcoal)	Education about the environmental risks / impacts of charcoal production. Stricter enforcement of rules regarding charcoal production. Potential grants to counter the loss in income.

3. Theory of Change

Here we present a short theory of change, depicting the key activities to be undertaken in order to complete the desired outputs and further achieving the five key outcomes. The main impacts are bigger and won't depend on the sole delivery of this programme, but they have been listed along the with key indicators to measure them.

Table 2: The general theory of change



Impacts	Outcomes	Outputs	Activities	KPIs
Reduction in respiratory diseases associated with the use of solid fuels	1) An enabling institutional, regulatory environment is put in place to allow the integration of cleaner energy technologies inside the camps;	Agree on a shared agenda	<ul style="list-style-type: none"> > Regular multi-parties' meetings between the UNHCR, ORYX, the MHA and the refugee representatives are scheduled. > National stakeholders' consultation with the: <ul style="list-style-type: none"> - Vice President's Office – Environment Division - Ministry of Energy and Minerals - Ministry of Home Affairs (Department of Refugee service) > Local stakeholders' consultation meeting with the: <ul style="list-style-type: none"> - PO-RALG (President Office, Regional and Local Government) - Ministry of Home Affairs (based in the camps) - Regional Commissioner's Office in Kigoma, - Kasulu, Kibondo and Kakonko Districts Commissioner > A list on barriers of intervention is designed following the meetings 	
Reduction in the cases of violence		Technical capacity of government staff improved for identifying the best route-to-market for cleaner energy solutions	<ul style="list-style-type: none"> > Development of a set of standards looking at safety, performance and durability for LPG products 	
Women empowerment		Database of results for advocacy and dissemination activities	<ul style="list-style-type: none"> > Effective feedback mechanisms to share progress. > Results of the evaluation are systematically documented for wider sharing with the humanitarian, scientific and development community. 	
Reduction of GHG emissions in the camps (CO2, CH4)	2) The development of a public-private partnership for the scale-up of the LPG market	A two years MoU with ORYX, the gas supplier, is signed	<ul style="list-style-type: none"> > Market intelligence documents are shared > Entry permits are provided to MEGS and ORYX to facilitate their activities in the camp > A collaborative risks assessment is conducted > Capped price on LPG is agreed 	
Reduction in the rate of forest degradation		Several grants are obtained to support the programme	<ul style="list-style-type: none"> > Drafting of a short concept-note in collaboration with implementing partner > Submission of a grant proposal to OFID, EU etc. 	

Reduction in respiratory diseases associated with the use of solid fuels Reduction in the cases of violence Women empowerment Reduction of GHG emissions in the camps (CO2, CH4) Reduction in the rate of forest degradation	3) The adoption of clean cooking technologies in the targeted communities to reduce energy poverty in line with SDG7.	The awareness campaign is launched in and around the camp	> Develop promotional material to improve public awareness of the impacts of cooking with biomass (health, economic, forests) and on cooking efficiency techniques > Create a testing centre managed by CEMDO to educate on the use, maintenance and benefits of LPG. > Develop radio-spots, and community theatre shows.	> Promotion of community-based public awareness on agro-forestry and kitchen gardening.
		The stoves are correctly used and well-maintained	> Develop manual to explain the rights & duties must of the cylinders owners > Engage the resellers and the incentive workers into after-sales mechanisms to build confidence and ensure high quality services. > A hotline is put in place for 6 months, operating 3 hours/ day in which a technical expert can answer any questions relative to LPG	> # of stoves bought and distributed > Average consumption of LPG per household > # of cases of flawed cylinders reported
		Financial incentives are introduced to increase adoption rates	> Define a list of socio-demographic criteria and their corresponding subsidies for the up-front costs of the cylinders and the refilling > Launch a pilot for the revolving loans funds > Pursue discussion with KopaGas to assess the feasibility of PayGo technologies in camps. - Design, implement and monitor provision of energy vouchers	
		End-users adopt efficient cooking practices		
		The beneficiaries perceive LPG as a safe/ easy to use fuel		
	4) New income-generating opportunities/jobs are created in the camp to foster self-reliance	A small-scale manufacture for trivets is operating in/ or around the camps, employing refugees	> Asses the feasibility of creating a small-scale factory inside or at the borders of the camps > Provided the design supplied by Oryx, develop a series of prototypes with local NGOs > Identification of raw material suppliers and value chain analysis > Facilitate iterative design improvements and ensure the refugees inclusion	
		A network of LPG resellers is established within the camps	> Choice of the reselling locations in the camps in line with safety regulations, refugees need and the MHA > Define targeting criteria to be a reseller > Organize training sessions and > Get licence to operate > Define payment mechanisms	
		New micro-enterprises are created	> Systematic programs in place to support the creation of micro enterprises	

Table 3: Impacts of the programme and measurements

Impacts	Measurements	Methods of survey
Reduction of the respiratory diseases associated with the use of solid fuels	<ul style="list-style-type: none"> > Measures concentrations and personal exposure of Particulate Matters (PM) and Carbon Monoxide > Respiratory diseases incidence > Health Expenditure at the hospital to treat respiratory diseases > Reported cases of back pains, blocked noses, eye irritations 	<ul style="list-style-type: none"> > Liaise with WHO > Interviews > Interviews > Questionnaires
Improvement of refugee welfare and well-being	<ul style="list-style-type: none"> > Income and household expenditure > Economics at the common market (# of business operated by refugees) > # of new business created after the start of the pilot > # of credit financing mechanisms > Food security (# of meals skipped, reported cases of malnutrition) > Average time spent for cooking > Average time spent for firewood collection 	<ul style="list-style-type: none"> > Questionnaires > Interviews, focus groups > Questionnaires > Observations > Questionnaires, Interviews (WFP)
Reduction in the rate of forest degradation	<ul style="list-style-type: none"> > Land use change around camp > Natural resources supply and demand > Prices of firewood and charcoal > Production of charcoal in the districts 	<ul style="list-style-type: none"> > Observations > Liaise with the FAO and the Jane Goodall Institute
Improved relationships between the HC and the refugees	<ul style="list-style-type: none"> > # of reported cases of violence > # of reported cases of SGBV 	<ul style="list-style-type: none"> > Questionnaires, Interviews > Focus groups with refugees and host communities > Outcomes of the monthly meetings between POC, UNHCR and the HC

Assumptions of the programme

- The LPG programme is not opposed / blocked by the Tanzanian government
- Political will from the Tanzanian government to promote LPG fuel for cooking in the Kigoma region, as indicated by the regulations, laws and authorisations adopted.
- Active and committed local stakeholders are identified and take ownership of the programme and promote it
- Donors are concerned with their environmental stewardship in humanitarian settings, and are willing to support the roll-out of an LPG program.
- Vulnerable households have been identified and are prioritised
- There are no behavioural barriers from the beneficiaries to hinder a high adoption rate.
- The beneficiaries switch to LPG as their main stove, and don't practice 'stove stacking'.
- ORYX supplies a high-quality service, by doing so they build trust amongst the refugees.
- The price of gas cylinders is capped by the UNHCR.

4. Mapping of the key partners

The following stakeholders are deemed to be central to the implementation of this programme.

UNHCR Tanzania

This roadmap exemplifies the kinds of partnerships that UNHCR is seeking in order to respond to the energy crisis faced by the refugees in Kigoma. Since the creation of the Moving Energy Initiative (MEI) in 2014, researchers and practitioners have constantly drawn attention to the numerous development benefits and the poverty alleviation associated with households' access to energy. Although there is still no energy cluster at UNHCR headquarters level in Geneva, this perseverance is paying off, as donors have already expressed their interest in investing in cleaner energy solutions. At a national level, Safe from the Start funded two pilot projects to use LPG for cooking which were highly successful. Consequently, UNHCR has declared access to safe sources of fuel as a core priority of its wider sustainable household energy strategy in Tanzania, hence the current report.

ORYX Gas Tanzania Limited ORYX

ORYX Gas Tanzania Limited (ORYX) has had a presence in Tanzania since 1999 and is the current market leader, supplying approximately 65% of the local market for LPG. ORYX imports 50,000 Metric Tons (MT) of LPG per year for diverse usages such as cooking, industrial applications (manufacturing, dairy processing) and commercial uses (e.g. hospitality). Their closest storage and filling points to Kigoma are located in Mwanza and Isaka with a storage capacity of MT 200

and MT 25 Metric Tons respectively. In the Kigoma region, ORYX works with two distributors: Issa Mangapi based in Kigoma town and Mama Electrical General Supplies (MEGS) situated in Kibondo. The programme to supply LPG in refugee camps is aligned with ORYX's commercial ambition to create a sustainable and profitable market for LPG in the Kigoma region, using the opportunity offered by the UNHCR. Several discussions have already taken place and the company seems to be the best placed to serve the needs of displaced people and the rural communities of Kigoma. ORYX's attitude vis-a-vis of the programme has been positive and their support is a key factor to its success. As such, they should be included at every stage of the decision-making process, and an adequate feedback/communication mechanism should be put in place. To be profitable, ORYX estimated the need to refill approximately 8,000 cylinders at the end of fourth month of the programme. Willing to collaborate with the UNHCR, ORYX has agreed to reduce its reselling margin and has offered a price of TZS 18,500 and TZS 21,000 to the resellers and end users respectively per refill of a 6kg cylinder (based on current world market prices).

MAMA ELECTRICAL AND GENERAL SERVICES (MEGS)

MEGS'S head office is in Kibondo. The company has branches in Kakonko, Kasulu and Uvinza Districts (Kigoma region) and is expecting to open another branch in Buhigwe District in 2018. MEGS started dealing with LPG in 2012 as a reseller receiving deliveries from ORYX Distributors based in Mwanza and Shinyanga regions and further became an ORYX Distributor in 2016. MEGS has been supplying LPG to five (5) Hospitals in the Districts of Kakonko, Kibondo and Kasulu in Kigoma Region since 2012 and has been working in partnership with UNHCR and its implementing partners in supplying LPG to UNHCR LPG Pilot projects: two in Nyarugusu with 3,180 beneficiaries and one in Mtendeli with 180 beneficiaries (Burundians only). MEGS' Technical Support team comprises of one Local LPG Expert and several technicians that facilitate supplies and technical assistance to customers.

SNV – Netherlands Development Organization

SNV – the Netherlands Development Organisation -- has been present in Tanzania for over 40 years, with energy programming beginning in 2008. Since 2013, SNV in Tanzania has been lead implementer of the global Energizing Development (EnDev) program - a multi-donor partnership aiming to enhance the use of modern energy by developing new markets and promoting the use of results-based financing. In Tanzania, SNV EnDev projects support the development of markets for Improved Cook Stoves (ICS) and PicoPV solar through the strengthening of the private sector and supply chain actors, to provide relevant and in demand energy solutions to consumers. To date, SNV EnDev programming has supported more markets for an additional 100,000 renewable energy technologies benefitting more than half a million rural Tanzanians. With support from BMZ-GIZ, SNV has developed the Renewable Energy

Services & Products as an Opportunity in National and Displaced (RESPOND) project which builds upon SNV EnDev programming for energy market development in the humanitarian arena. While this will be SNV's first work in refugee and host community humanitarian contexts, SNV has extensively operated in the field of renewable energy and possess an in-depth knowledge of the inherent challenges faced by the rural population in Tanzania. The RESPOND project will support UNHCR and partners in energy programming in Kigoma Region in three areas: clean cooking, access to high-quality solar energy products, and reforestation practices. The team will start the inception phase of this programme in mid-2018. After numerous consultations and exchanges with the local and international team, it appears that SNV is ideally positioned to implement the LPG for cooking programme. Indeed, the organization has extensive experience in the field and very good relations with the national actors of the country. To ensure consistency, leadership and to build required capacity, it is recommended to place all activities under the umbrella of SNV, including all programmes associated with access to cleaner energy solutions in the refugee camps in Kigoma. To deliver the intended outcomes of the cooking for LPG programme, SNV would need to expand its current RESPOND and EnDev activities with additional financing to accommodate the LPG initiatives. A list of potential donors is provided in section 6.

CEMDO - Community Environmental Management and Development Organization

CEMDO is a Tanzanian NGO operating in Nyarugusu camp, tasked by UNHCR to deliver environmental awareness within the camp, small scale kitchen gardening and afforestation programmes. During the first two phases of the LPG pilot, CEMDO was in charge of the operational implementation e.g. maintenance of the storage and distribution of the LPG cylinders. CEMDO's experience is an asset and they will be instrumental in the development of the programme, working in partnership with SNV.

The World LPG Association (WLPGA)

The WLPGA were consulted at an early stage of the programme development. The WLPGA will be able to provide guidance on the regulatory aspects of LPG use, with infographics and educational campaigns, best practices in the field. Their support and presence would be helpful during the negotiations with the Government of Tanzania, and have strong contacts with main industry players across the world.

KopaGas

KopaGas is a start-up company based in Dar es Salaam and a ORYX 'super-dealer' (wholesale distributor). They are the first to develop a Pay As You Go (PAYG) smart meter for LPG. Their business model removes a major barrier to entry, as they only require their clients to pay a deposit for the cylinder (instead of the full price). They further ensure the delivery of a 15kg

cylinder, the burner and the stove. When the cylinder is running low, the beneficiaries are alerted and given the opportunity to top-up the gas using digital technology. In the case of a non-payment for more than three months, the cylinder will be removed. The customer pays an additional TZS 8,000 (approximately \$3.6) per 15 kg bottle of LPG, which is equivalent to just over 500 TSH (approximately 0.25 USD) per kg of LPG, for the convenience of using the PAYG model, avoiding the purchase of a stove and not having to pay for the cost of the initial bottle of gas.

5. Risks and mitigating actions

For a programme of this magnitude, is it impossible to foresee all the challenges, so the process must be flexible enough to allow feedback or corrections on a regular basis, without having to wait for the next milestone. The main risks have been depicted in the table 4.

Resilience to external shocks

Resilience to external shocks is of direct importance to ensure the sustainability of the programme, for example an increase in oil prices would be reflected in consumer prices. Regular and/or significance price increases would generate a distrust from the beneficiaries or new clients, likely suppress demand. Accordingly, ORYX and UNHCR shall sign a MoU to secure a capped price. In addition, the possible return of the Burundian refugee population should not be ruled out, and the GoT has indicated its desire for this to happen. For that reason, the implementing partner must be able to return their deposit (cash) to the recipients within a very short time frame. In regards to the implementing partner (SNV), they are well established in Tanzania, and there is a limited risk of a sudden abandonment of all national operations. To prevent any risk of favouritism, the subsidy scheme must be agreed and endorsed by all parties, with specific mention of the status and number of recipients, duration and boundaries of the activities.

Exit strategy

As the first phase comes to an end, a second donor will come into play to ensure the continuation of the market creation. The SE4ALL initiative advocated for the supply of clean and affordable energy to the poor and to leave no one behind in the global transition to sustainable energy systems. Consequently, there will be an ongoing need to provide refugees with access to cleaner sources of fuel, as this is a major driver of development and reduces the risks faced by women and children. Thus, while an exit strategy needs to be carefully designed, the programme calls for on-going funding geared towards the most vulnerable within and around refugee settlements (based on the grounds of equity).

Table 4: Risks and mitigation measures

Type of risks	Description	Mitigation measures
Policy	<p>The intervention will be deployed in a highly politicised context, as evidenced by the GoT's decision to withdraw from the CRRF in early 2018. This may compromise the development of the programme</p> <p>The GoT refuses the allocation of subsidies to the refugees</p> <p>The GoT refuses the refugees the right to actively participate in the distribution of the LPG.</p>	<p>> The implementing team will maintain regular contacts with the MHA and government at all levels, but has ultimately poor control over this decision.</p> <p>> Environmental mitigation programmes has been highlighted by the GoT as a priority, and LPG is a technology prioritised by the GoT.</p> <p>> Remain focused on the benefits of an LPG market for the region as a whole and for the HC in particular</p> <p>> Although smaller than expected, a small portion of households/small-business will still be able to buy LPG</p> <p>> A refilling station will be located at the border of the camp.</p>
Economic	<p>Market leakage, cylinders are resold for a higher price outside the camps.</p> <p>The demand for LPG is lower than expected</p> <p>Service is poorly delivered, products fail</p>	<p>> It may happen, however during the two first phases of the pilots, the adoption rate was very high (>95%) and no threat were reported.</p> <p>> Implement formal mechanisms for the recipients to receive their deposits easily if they wish to stop using LPG > will undermine the informal trades</p> <p>> There is no minimal order in the agreement between UNHCR and Oryx</p> <p>> Feedback mechanism in for rapid correction with ORYX</p>
Social	Lack of inclusion of the poorest households; unable to afford, even partially, or save for, the refill of LPG cylinders, they are de-facto excluded by the programme.	> There is a further need to increase a fine screening and ensure that non-beneficiaries will be offered other cooking options such as ICS, sustainable charcoal briquettes, prime target for afforestation program, or employment opportunities. Important to integrate the programme in the matrix of related solutions proposed and/or implemented by SNV.
Security and safety	LPG explosion	> The reselling point or storages are following the regulations/ safety norms

6. Monitoring and evaluation

The data collected during the CBA study will act as a baseline survey for the market creation programme. However, prior to the implementation of the programme this should be updated with another small-scale survey to verify / update energy demand and expenditure. After four months, an evaluation will be undertaken to assess the progress being made towards the completion of the outputs and to identify any required changes. The mid-term evaluation will focus on identifying limiting factors. When performing this evaluation, the number of households using LPG should not be considered as a sufficient progress indicator. Rather, the longevity and the sustainability of the programme should be assessed using other indicators, to capture the true benefit of the programme to the household beneficiaries, local environment and economy. The TOR for the mid-term evaluation will be drafted by the implementing partner, in collaboration with the UNHCR. Below is a non-exhaustive list, which could be considered as a good starting point:

- The consumption of LPG per household
- The number of incidents reported while using LPG (safety issues)
- The number of restaurants or SMEs using LPG in the camps
- The number of LPG resellers in and outside the camps
- The numbers of women using credit facilities and accessing the labour market (formal or informal)
- The number of reported cases of respiratory illnesses in the camp hospital
- Number of reported cases of conflict with host communities (police records)

As this programme is likely to attract significant attention, donors and partners should strive/make it a priority to measure, after twelve months, the degree to which clean cooking generates the expected impacts. Indeed, measurable impacts multiply new opportunities for other funding and are fundamental to supporting programme replication and funding in other settings. Appropriate metrics will have to be designed and consistent data collected, to see the progress towards the overall goal of supplying households of the region with LPG (both refugees and locals). A possible list of indicators can be found in the theory of change (table 2). The use of randomised control groups will be essential so as to compare the real benefits, and attention should be made in measuring causal relationships, so as to conduct the 'gold impact' of impact assessment methodologies. Further, a dedicated communications strategy should be implemented. This will ensure that the key conclusions, lessons learned and recommendations are shared among humanitarian agencies, researchers and donors.

7. The funding strategy

OFID, the OPEC Fund for International Development

The OFID fund aims at 'Fighting all forms of poverty and strengthening the capacities of partner countries'. The vision is to aspire to a world where sustainable development centred on human capacity building is a reality for all; and their mission: to foster south-south partnership with fellow developing countries worldwide with the aim of eradicating poverty. The grant program is thus tailored to support initiatives that enhance livelihoods by addressing challenges in areas such as education, energy poverty, food security, public health, water supply and sanitation, which may not be directly funded through other financing windows. OFID's grant program includes technical assistance for small-scale social schemes, sponsorship for research and other intellectual pursuits, and humanitarian aid. As of 1st of January 2017, OFID committed to \$US 46.7 M (7.4% of their operations) in the fight against energy poverty, and \$108.5 M (17.2% of their operations) in humanitarian aid (mostly emergency situations). Most grants were issued with a value up to \$US 1,000,000.

UNHCR or SNV would be eligible to apply for OFID's grant assistance. OFID is looking for programmes which alleviate poverty and in particular those projects that promote the productive use of energy and those that enable income generating activities. It further supports the implementation of innovative business models and solutions that are replicable and sizeable. This commitment falls under SD7, to seeks to bring access to affordable and reliable modern source of energy and give access to clean cooking facilities.

The fund has already supported numerous projects in Tanzania, in different sectors: transportation, education and energy. Their project portfolio can be found [here](#). The technical assistance grant proposals are presented at OFID's Governing Board meetings held four times per year. Grant brochure [here](#) - Contact grants@ofid.org

The EU – European Commission

Their vision is to 'build partnerships for change in developing countries.' Grants are financial contributions that come from the EU budget or from the European Development Fund (EDF), and are awarded as contributions to third parties to carry out external aid activities. Grants fall into two categories: 1) grants for actions that aim to achieve an objective that forms part of an external aid programme; 2) operating grants to finance the running costs of an entity that is working in the general European interest, or on an objective that forms part of an EU policy.

The EU have financed projects (through grants or loans) in Tanzania in the fields of infrastructure, human rights, water and energy. The list of projects can be found [here](#) along with some case studies [here](#). There is no call for proposal available at the moment for energy

projects in Tanzania, see [here](#). In Niger, the EU financed a project that supplied 20,000 households with LPG for cooking over a six month period, with a 2.8 M€ grant, see section 1. The EC has expressed an interest to replicate this type of project as it demonstrated clear economic benefits for the poorest household.

It is recommended to work with Benoit Moreno – External relations Office – UNHCR Niger and request his presence and support when meeting with the EU delegations in Tanzania. SNV, through Josh Sebastian, has already made some preliminary contacts with the EU delegation in Tanzania. Therefore, they should be both the main points of contacts to implement this programme.

Tent – Smart Coalition

The Smart Communities Coalition seeks to improve the delivery of essential services to refugees and host community members through enhanced coordination between public and private entities and strategic implementation of technology. Efforts will focus on three foundational pillars — connectivity, digital tools, and energy access. Through technology and process innovation, the Smart Communities Coalition seeks to improve outcomes for both refugees and host community members by:

- Increasing efficiencies in camp management and service delivery
- Empowering refugees to provide for themselves and their families
- Equitably addressing the needs of host community members in and around targeted settlements.

Part of their work is directed through hiring refugees and integrating them through the supply chain, see [here](#). Although most of their work has been focused - so far - in Europe, they would be an ideal partner to support the livelihood dimension of the programme (e.g. small-scale factory and distribution networks). They don't provide direct grants but are working with an extensive network of partners (Accenture, Mastercard). More information [here](#)
Contact: Katrina Pielli, Senior Energy Advisor, Power Africa, kpielli@usaid.org

The Global LPG partnership (GLPGP)

The Global LPG Partnership assists developing countries to plan, finance and implement national-scale availability and use LPG, to help prevent the 4 million annual deaths, severe forest loss, and vast impact on women's and children's labour time caused by societal dependence on solid (biomass) fuels for cooking. Their goal is to enable the transition of one billion people to clean LPG use for household cooking by 2030, providing affordable access to modern energy as part of the transition to a sustainable future. More information [here](#).

The GLPGP will launch in 2018 a LPG First Costs Financing Fund ("FCF" Fund) The FCF Fund will unlock consumer demand for LPG through financial support for consumer acquisition of LPG equipment. It will support qualified local microfinance institutions (MFIs) and other qualified local consumer credit intermediaries to on-lend to LPG consumers and to facilitate local SME business expansions that support LPG market growth. Its purpose is to unlock consumer demand for LPG by mitigating the high up-front consumer costs for LPG equipment. For each focus country, details of such plans and associated funding opportunities for third parties will be posted in a special section of this web site, meaning that this programme may not qualify under their requirements, however it corresponds perfectly with their ambitions for 2018, therefore they should be considered and contacted.

8. List of the key arguments

To be completed as we move forward with the programme design

- Charcoal is increasingly consumed by the HC and the refugees thereby degrading natural reserves (Moyowosi Game Reserve)
- LPG has been identified by the MHA as the best means to enable the rehabilitation of areas of degraded by refugees
- By increasing the refugees' income, LPG use will boost the district and regional economy
- Act a pilot for designing smart-subsides (financed by the international donors)
- Can lead to the creation of 'renewable energy fairs' increasing the supply of such products in the Kigoma region
- Create jobs through formal channels (small-scale factory) that won't be higher than the capped salary in the camps (TZS 60,000)
- The subsidies (e.g. vouchers) will also target the host community

9. Notes to the reader

The above paper has been based on multiple discussions with:

UNHCR Tanzania	Mark Gibson	Environmental Consultant (left UNHCR in Dec. 2017)
UNHCR Tanzania	Måns Fellenson	Senior Solutions & Development Advisor CRRF
UNHCR Tanzania	Takaaki Miura	Associate Livelihood Officer
UNHCR Tanzania	Mariam Khokar	Associate Protection Officer (left UNHCR in Feb. 2018)
UNHCR Geneva	Paul Quigley	
UNHCR Niger	Benoit Moreno	External Relations Officer

Oryx Tanzania	Mohamed Mohamed	Retail Sales Manager
Oryx Tanzania	Nick McAleer	Country Director & Co-Founder
KopaGas	Sebastian Rodriguez	CEO
SNV Tanzania	Josh Sebastian	Sector Leader, Energy
World LPG Association	Michael Kelly	Deputy Managing Director

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11. Appendix

Design of the trivets

